

71006

May 1998 CALFED ECOSYSTEM RESTORATION PROPOSAL SOLICITATION

Development of Propagation & Re-Introduction Techniques
 Proposal Title: for Delta Special Status Plant Species
 Applicant Name: Bitterroot Restoration, Inc.
 Mailing Address: 445 Quast Lane, Corvallis, MT 59828
 Telephone: (406) 961-4991
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Amount of funding requested: \$ 770,785 for 3.25 years

Indicate the Topic for which you are applying (check only one box). Note that this is an important decision: see page __ of the Proposal Solicitation Package for more information.

- | | |
|---|--|
| <input type="checkbox"/> Fish Passage Assessment | <input type="checkbox"/> Fish Passage Improvements |
| <input type="checkbox"/> Floodplain and Habitat Restoration | <input type="checkbox"/> Gravel Restoration |
| <input type="checkbox"/> Fish Harvest | <input checked="" type="checkbox"/> Species Life History Studies |
| <input type="checkbox"/> Watershed Planning/Implementation | <input type="checkbox"/> Education |
| <input type="checkbox"/> Fish Screen Evaluations - Alternatives and Biological Priorities | |

Indicate the geographic area of your proposal (check only one box):

- | | |
|---|---|
| <input type="checkbox"/> Sacramento River Mainstem | <input type="checkbox"/> Sacramento Tributary: _____ |
| <input checked="" type="checkbox"/> Delta | <input type="checkbox"/> East Side Delta Tributary: _____ |
| <input type="checkbox"/> Suisun Marsh and Bay | <input type="checkbox"/> San Joaquin Tributary: _____ |
| <input type="checkbox"/> San Joaquin River Mainstem | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> Landscape (entire Bay-Delta watershed) | <input type="checkbox"/> North Bay: _____ |

Indicate the primary species which the proposal addresses (check no more than two boxes):

- | | |
|--|--|
| <input type="checkbox"/> San Joaquin and East-side Delta tributaries fall-run chinook salmon | <input type="checkbox"/> Spring-run chinook salmon |
| <input type="checkbox"/> Winter-run chinook salmon | <input type="checkbox"/> Fall-run chinook salmon |
| <input type="checkbox"/> Late-fall run chinook salmon | <input type="checkbox"/> Longfin smelt |
| <input checked="" type="checkbox"/> Delta smelt | <input type="checkbox"/> Steelhead trout |
| <input checked="" type="checkbox"/> Splittail | <input type="checkbox"/> Striped bass |
| <input type="checkbox"/> Green sturgeon | |
| <input type="checkbox"/> Migratory birds | |



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Indicate the type of applicant (check only one box):

- | | |
|--|---|
| <input type="checkbox"/> State agency | <input type="checkbox"/> Federal agency |
| <input type="checkbox"/> Public/Non-profit joint venture | <input type="checkbox"/> Non-profit |
| <input type="checkbox"/> Local government/district | <input checked="" type="checkbox"/> Private party |
| <input type="checkbox"/> University | <input type="checkbox"/> Other: _____ |

Indicate the type of project (check only one box):

- | | |
|--|---|
| <input type="checkbox"/> Planning | <input type="checkbox"/> Implementation |
| <input type="checkbox"/> Monitoring | <input type="checkbox"/> Education |
| <input checked="" type="checkbox"/> Research | |

By signing below, the applicant declares the following:

- (1) the truthfulness of all representations in their proposal;
- (2) the individual signing the form is entitled to submit the application on behalf of the applicant (if applicant is an entity or organization); and
- (3) the person submitting the application has read and understood the conflict of interest and confidentiality discussion in the PSP (Section II.K) and waives any and all rights to privacy and confidentiality of the proposal on behalf of the applicant, to the extent as provided in the Section.



(Signature of Applicant)

II. EXECUTIVE SUMMARY

Development of Propagation & Re-introduction Techniques for Delta Special Status Plant Species

Submitted by : Tom Parker, Principal Investigator, Bitterroot Restoration Inc., Corvallis, MT

Approximately 37 plant species have been selected as species of concern in the Delta area (Appendix A). The ability to grow Delta plant species at a large scale would make it possible to restore large areas of native ecological communities in the Delta. In addition, more than 1100 miles of levees could potentially be re-vegetated at the critical land/water interface where most habitat loss has occurred. Bitterroot Restoration (BRI) proposes to develop the fundamental knowledge and technology for large-scale production of Delta native plant species and define techniques for re-introduction of these plants.

BRI will accomplish this goal through a four phase project conducted over a three year period. Phases will consist of: 1) a review and evaluation of current species information; 2) field investigations to further research unknowns determined during the review of species information; 3) propagation protocol development to be conducted under laboratory and greenhouse conditions; and 4) re-introduction studies which will consist of field experimentation and demonstration plots. These studies will also consider the use of direct seeding and restoration of site conditions as means of restoring plant communities. All research will be conducted in a scientific manner suitable for publication and will be promoted to a diverse public audience through demonstration projects and educational outreach.

The total cost for implementation of this project is \$ 770,785. Cost breakdown by phase is as follows : Phase I - \$40,961; Phase II - \$160,035; Phase III - \$ 206,906; and Phase IV - \$ 362,833. Budgeting may be refined as project needs are better defined. Bitterroot Restoration will provide access to the full consulting staff and technicians as necessary. All materials and supplies for completion of the project will be provided.

Benefits resulting from this project are many. Ultimately, this project will fulfill the basic need for economical native plant materials required for Delta projects. Information generated in the course of the project will also be important for future efforts to control exotic plant species, understand broader plant community relationships (beyond species of concern), develop bioengineering techniques as alternatives to hard engineering techniques for levee maintenance and flood control, and develop plant propagation protocols and outplanting techniques in other regions with similar challenges. In addition, it will provide the opportunity to meet the objectives of the Conservation Strategy.

Bitterroot Restoration is uniquely qualified to complete this project. BRI has developed propagation protocols for over 250 species of plant native to the western United States and produced these in commercially available quantities. Our company consists of restoration consulting, plant propagation, and implementation divisions. Our staff includes professionals in wetland ecology, plant physiology, restoration ecology, horticulture, landscape architecture,

forest ecology, and natural resources. In addition, we have associates specializing in range ecology, soil science, photo-interpretation, and soil microbiology. Currently, BRI's California clients include Yosemite National Park, Sequoia-Kings Canyon National Park, and the Atlas Mine Superfund Site.

Monitoring and data evaluation are embedded in the four phases of this project. All studies conducted as part of this proposal will be designed with input from CALFED agencies and academic institutions. All data collection will occur with the intention of producing publishable quality, peer reviewed research.

Bitterroot Restoration will seek local support for plant species re-introduction and levee stabilization projects through the development and promotion of a public outreach program. The program will emphasize the compatibility of special status plant species with engineering goals for the Delta. In addition, BRI will participate in all appropriate meetings and coordinate with agencies concerning seed and soil acquisitions for studies.

**Development of Propagation & Re-introduction Techniques
for Delta Special Status Plant Species**

Tom Parker, Principal Investigator
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IV. PROJECT DESCRIPTION

Project Description & Approach. CALFED proposes to restore a large acreage of wetland and riparian habitats as part of the Ecosystem Restoration Plan Program and to stabilize levees as part of the Long-term Levee Protection Plan. Fundamental to the successful restoration and revegetation of these sites will be the large-scale availability of native plant materials and the ability to successfully re-introduce plant species. With respect to this need, Bitterroot Restoration Incorporated proposes to develop the fundamental knowledge and technology for large-scale propagation of native plant species and define techniques for re-introduction of plants into these habitats.

Project Goal: To develop the fundamental knowledge and techniques for large-scale propagation and re-introduction of native plant communities in the Delta.

Objective 1: A primary objective of the proposed project will be the development of propagation methods for approximately 37 special status native plant species required by the Delta project. This objective will result in published propagation standards for production of these plant species.

Objective 2: The second objective will be to develop re-introduction techniques for special status species and evaluate plant performance on introduction sites. A series of field studies and demonstration projects will be conducted, resulting in published recommendations for re-introduction of species.

Project Phasing :

- ◆ **Phase I : Review and Evaluation of Current Special Status Species Information.** Identify available information regarding seed germination, plant propagation, reproductive strategies, associated rhizosphere organisms, and plant establishment;
- ◆ **Phase II : Field Investigations.** Conduct field research to investigate native and disturbed site conditions in preparation for further project phases;
- ◆ **Phase III : Propagation Protocol Development.** Conduct greenhouse and laboratory research to develop techniques for seed germination, plant propagation, and inoculation with appropriate rhizosphere micro-organisms;
- ◆ **Phase IV : Re-introduction Studies.** Develop re-introduction techniques aimed at establishing fully functioning, sustainable plant communities on experimental sites.

Coordination, Reporting, & Public Education. A team approach will be employed that ensures all projects will be coordinated with CALFED agencies. All technology and data developed will become public information through publication. All study and demonstration sites will be actively promoted to the general public and educational institutions through outreach and extension activities during the project.

Proposed Scope of Work

Phase I : Review and Evaluation of Current Special Status Species Information. The goal of Phase I will be to review current information concerning Bay-Delta species in order to identify knowledge gaps related to propagation and re-introduction levels.

Task 1: Literature Review and Oral Interviews. BRI will identify existing research results at the species level regarding seed germination, propagation, root rhizosphere biology, and reintroduction techniques for plant species of concern identified within the ERPP, and other species identified as part of the Conservation Strategy. Sources may include: universities; peer-reviewed journals; botanical gardens; national seed laboratory; California Native Plant Society; The Nature Conservancy; California Natural Heritage Program; U.S. Fish and Wildlife Service; Thomas Payne Institute; and local native plant nurseries.

Task 2: Identification of Propagation Studies. Following review of information gathered during the literature review and oral interviews, study questions will be developed and prioritized for implementation during Phases II, III, and IV.

Schedule: October 1, 1998 - April 1, 1999.

Budget: \$ \$40,961.

Deliverables (minimum):

- ▶ "Report to CALFED : Synopsis of Current Biological Information on Special Status Delta Plant Species"

Phase II : Field Investigations. The goal of Phase II will be to supplement existing information on species' life history, reproductive biology, site requirements, and plant-rhizosphere associations through field investigations.

Task 1: Field Investigations. BRI will visit representative sites to acquire data required for propagation and re-introduction studies. Population status and phenology will be monitored to assess timing of seed maturation and potential seed harvest. Sampling units will be established and relevant data collected on selected vegetative characteristics such as plant density, coverage of plants; site aspects; and position relative to moisture. Plant tissue samples may be collected for positive identifications when absolutely necessary. Soil samples will be collected and analyzed for typical physical, biological, and chemical characteristics. BRI will obtain necessary permits and coordinate with agencies prior to field investigations.

Task 2: Seed Acquisition/Collection. Seed acquisition from seed banks, botanical gardens, and other sources will be conducted prior to beginning field collection of seed. Field seed collection will be conducted under mutually agreed upon guidelines following coordination with CALFED agencies and acquisition of appropriate permits.

Task 3: Rhizosphere Organism Collection. Rhizosphere soil containing micro-organisms will be

collected in order to develop inoculation protocols for seedling production. Field collection will be conducted under mutually agreed upon guidelines following coordination with Bay-Delta agencies and acquisition of appropriate permits.

Schedule : April 1, 1999 - December 31, 1999.

Budget : \$ 160,035.

Deliverables (minimum):

- ▶ "Report to CALFED : Recommended Propagation and Re-introduction Studies"
- ▶ "Report to CALFED : Recommended Field Investigations"
- ▶ "Report to CALFED : Habitat and Phenology of Delta Plants"

Phase III : Propagation Protocol Development. The goal of Phase III will be to develop standard propagation protocols for special status Delta species.

Task 1: Seed Germination Protocols. BRI will conduct research in the areas of control and manipulation of seed dormancy and germination. BRI will conduct studies to assess seed response to a variety of procedures which will result in dormancy release and germination initiation. Identified treatments will allow for economic production of plant materials.

Task 2: Propagation Protocols. BRI will conduct experimental research to determine appropriate protocols for large-scale production of Delta plants. Basic variables to be considered are: soil components; pH; nutrient solutions; watering regimes; growing temperatures; light requirements; hardening procedures; and holding methods. Specific growth factors will be identified for difficult to grow plants and experiments designed to identify better growth parameters. Studies will be conducted according to the scientific method.

Task 3: Rhizosphere Microbial Inoculation Protocols. BRI will isolate and culture site-adapted soil microbial organisms for inoculation of plant materials. Greenhouse trials will be conducted to identify optimal inoculation techniques and evaluate the response of plants to inoculation.

Schedule: September 1, 1999 - August 31, 2000

Budget: \$ 206,906.

Deliverables (minimum):

- ▶ "Report to CALFED : Germination Protocols for Delta Plant Species"
- ▶ "Report to CALFED : Propagation Protocols for Delta Plant Species"
- ▶ "Report to CALFED : Rhizosphere Organism Cultural and Inoculation Protocols"

Phase IV : Re-introduction Studies. The goal of Phase IV will be to develop establishment techniques which will produce sustainable plant communities.

Task 1: Evaluation of Re-introduction Techniques. BRI will evaluate different techniques for

improving plant survivorship following outplanting. Factors which may be studied include: site preparation, elimination of plant competition, herbivory deterrents, micro-site requirements, and microbial inoculation. All studies will be conducted using the scientific method.

Task 2: Assessment of Plant Materials for Levee Stabilization. Particular plant species tested may have characteristics desirable for stabilization of levees. We will evaluate rooting resistance to shear stress, ability to trap sediment, and compatibility with other engineering requirements.

Schedule: June 1, 2000 - December 31, 2001.

Budget: \$ 362,883.

Deliverables (minimum):

- "Report to CALFED : Evaluation of Re-Introduction Techniques"
- "Report to CALFED : Assessment of Plant Materials for Levee Stabilization"

Location and/or Geographic Boundaries of Project

This project will not be limited to any particular location within the Delta. BRI will seek access to populations of plant species throughout the Delta based upon information in the Natural Diversity Database (State of California Natural Heritage Division). Areas appropriate for plant establishment trials will be identified during Phases I and II. These areas will be on lands owned by CALFED or other public entities and may include the McCormick-Williamson Tract, Sherman Island, Prospect Island, Liberty Island, and Twitchell Island. Sites will represent a range of salinity and degrees of tidal influence.

Expected Benefits

The basic research provided by this project will support restoration and revegetation goals stated in the ERPP, Conservation Strategy, and Long-term Levee Protection Plan. The fundamental ability to propagate and successfully establish native plants can fulfill both habitat restoration and levee protection goals. In addition, the information resulting from the project will result in an economic means for plant production. Propagation data and analysis will provide a needed supplement to the general literature and provide for increased competition and subsequent lower costs for revegetation materials. In addition, this project will provide highly visible demonstration projects, outreach, and education.

Background and Ecological/Biological/Technical Justification

This proposal directly addresses multiple needs stated in the Ecosystem Restoration Program Plan and the Long-Term Levee Protection Plan. The information and technologies developed through this project will influence levee maintenance, erosion, sedimentation, and exotic plant species stressors through the future development of large-scale habitat restoration projects.

ERPP. The Ecosystem Restoration Program Plan (Volume 1) describes special status plant species that belong to several plant community groups occupying different habitats (ERPPv1 p. 182-197) (see Appendix A). A consistent need identified in the ERPP is the restoration of special

status plant species and their habitats. On ERPPv1 pp. 203-205, planners have identified actions and opportunities for restoration, including reintroducing native plants to suitable sites, levee setbacks and breaches, and created levee berms. For example, at the ecosystem scale (ERPPv1 p. 182), one of the implementation objectives is "Develop appropriate methods to protect and restore habitat and populations of special-status plant species." At the species scale (ERPPv1 p. 189) an objective is to conduct studies to determine the micro-habitat requirements of eel-grass pondweed and determine reasons for limited distribution.

Our project addresses stressors associated with special-status plants in these ways:

- 1) Loss of appropriate habitat. The focus of Phases II and IV will be the assessment of existing native plant communities and experimentation for creating new habitats to support desirable plant communities. Our intention is to make habitat compatible with the development of levee designs.
- 2) Loss of special-status plant ecotypes. Phases I and III directly address this stressor by identifying propagation protocols and preserving germ plasm for future use. In instances where special-status plant species are exterminated in the wild, germ plasm and protocols will be available for re-introduction efforts.
- 3) Information Deficit. Currently, little information exists on the propagation of native plants. Consequently, native plant production for many species is unpredictable and expensive. Published protocols for plant propagation and re-introduction will result in more available tools for CALFED decision makers and reduced costs due to more efficient production by growers.

Levee Protection & Maintenance. This proposal addresses the conflict between current management of levees and natural plant communities. Because current levee maintenance practices require keeping steep levee surfaces clear of vegetation, little or no substrate remains that is suitable for plant communities that depend on the land/water interface. According to the Long Term Levee Protection Plan, Appendix A, page 6, "...projects to restore or enhance habitat can achieve multiple objectives if they are planned with levee vulnerability in mind." Appendix B in the same document includes examples of levee cross-sections with more gradual slopes that would provide: 1) levee stability by increasing levee mass and 2) appropriate substrate for plant communities by creating a less steep levee face. If the PL 84-99 standard is adopted (page B-2, Long Term Levee Protection Plan), a 3:1 to 5:1 slope will provide much more suitable substrate for plant growth than is currently available on steeper levee slopes.

With respect to levees, our project addresses stressors in the following manner:

- 1) Levee Erosion. Currently, levee maintenance includes removal of vegetation. Developing technology to establish functioning plant communities with deep, binding root mass on re-sloped levees will meet both the goals of levee stability and habitat restoration. Our proposal can support the following Implementation Objectives, Targets, and Programmatic Actions related to the Levee stressor: Investigate the feasibility of levee setbacks in the Delta; convert selected Delta islands to a mosaic of deep- and shallow-water and tule-marsh habitats; and build innovative benches to support shoreline habitats, where levees must remain (ERPPv1 p. 284).

2) Exotic Plant Invasion. Planting of native species addresses this stressor in two ways: 1) native plants physically occupy the substrate, limiting area available for exotics; and 2) native plants provide a seed source for perpetuating and expanding the native plant community.

3) Maintenance Costs. Availability of plant materials for bioengineering purposes will provide an alternative to hard engineering methods and potentially reduce cost associated with maintenance activities. Our proposal can support the following Implementation Objectives, Targets, and Programmatic Actions related to the Dredging and Sediment Disposal stressor: Maximize the reuse of dredged materials for habitat restoration and other beneficial uses and minimize the amount of disposed material that is subject to re-suspension and subsequent re-dredging.

Fish Species of Concern. Based on ERPPv2, the following fish species will benefit from improving aquatic wetland shallow water, or riparian habitats: Delta Smelt (p. 64); Longfin Smelt (p. 64); Splittail (p. 65); Chinook Salmon (p. 66); Steelhead Trout (p. 67); and other resident fish species (p. 68). Most other fish and animal species of concern would also benefit from wetland plant community reestablishment (ERPPv2 pp. 69-76).

1. Sediment. Plants filter sediment, providing a means to increase terrestrial habitat as sediment accumulates, and also creating cleaner water conditions. Reduced sedimentation into riverine systems would directly benefit fish species of concern.

2. Reduction of water table. In areas that have changed from a wetland plant community to an upland plant community, habitat modification projects designed to maintain water levels will raise the water table and subsequently input higher volume and quality of water into the riverine system. This will directly benefit fish species.

Monitoring and Data Evaluation

Monitoring and data evaluation procedures are embedded in the four phases of the project. All studies conducted as part of this proposal will be designed with input from CALFED, other agencies, and academics. All data collection will occur with the intention of producing publishable quality, peer reviewed research.

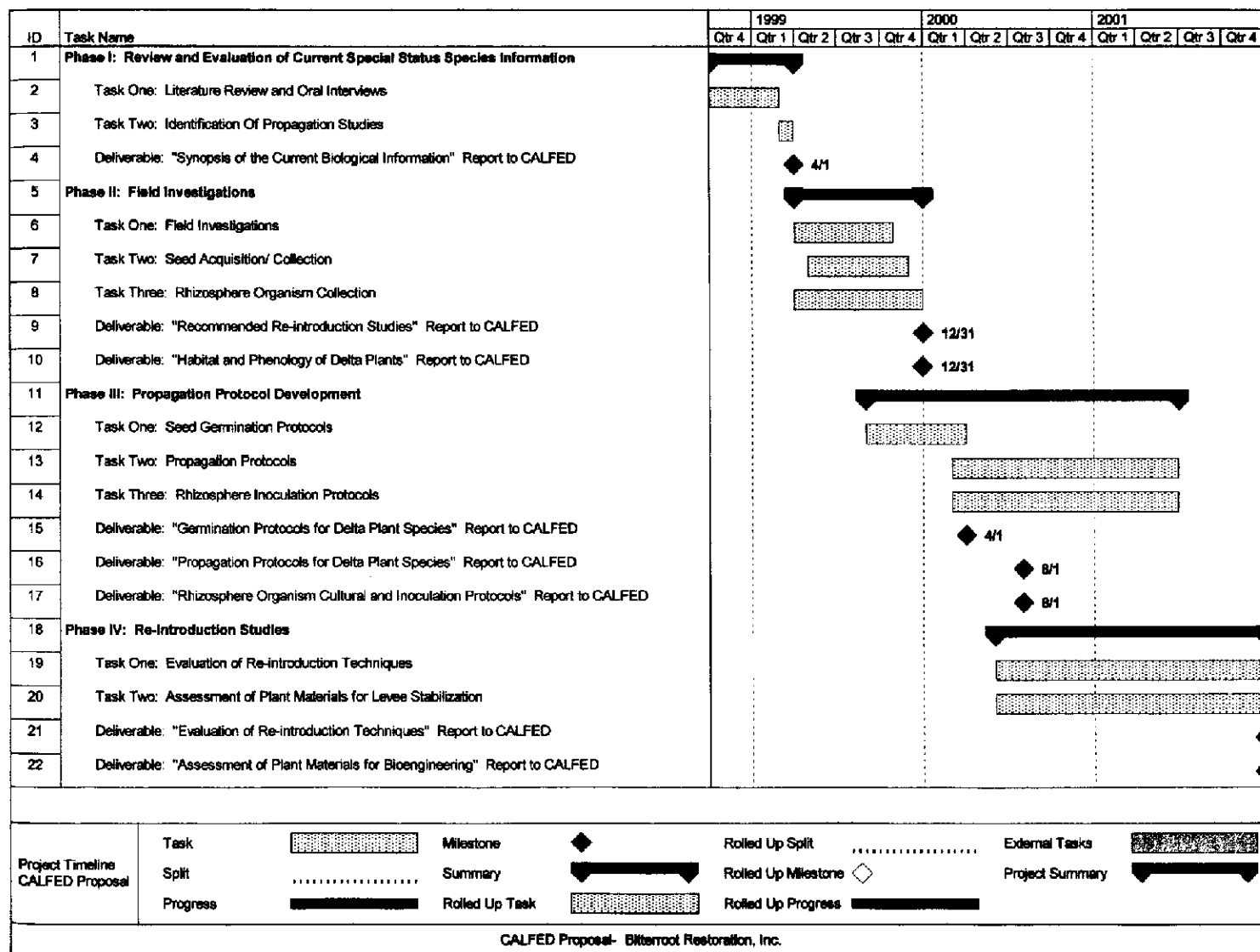
Implementability

The proposed project will be implementable with minimal impacts to natural resources and the surrounding community. BRI will comply with all local, state, and federal environmental laws and apply for all appropriate permits related to seed collection, research, and production activities which result from this project. In addition, all activities will be coordinated with and input requested from CALFED and other agencies. BRI will actively develop and promote a community outreach program which educates all educational levels and the general public about the CALFED project. An additional positive impact to the community may be employment opportunities for both professional and technical level people.

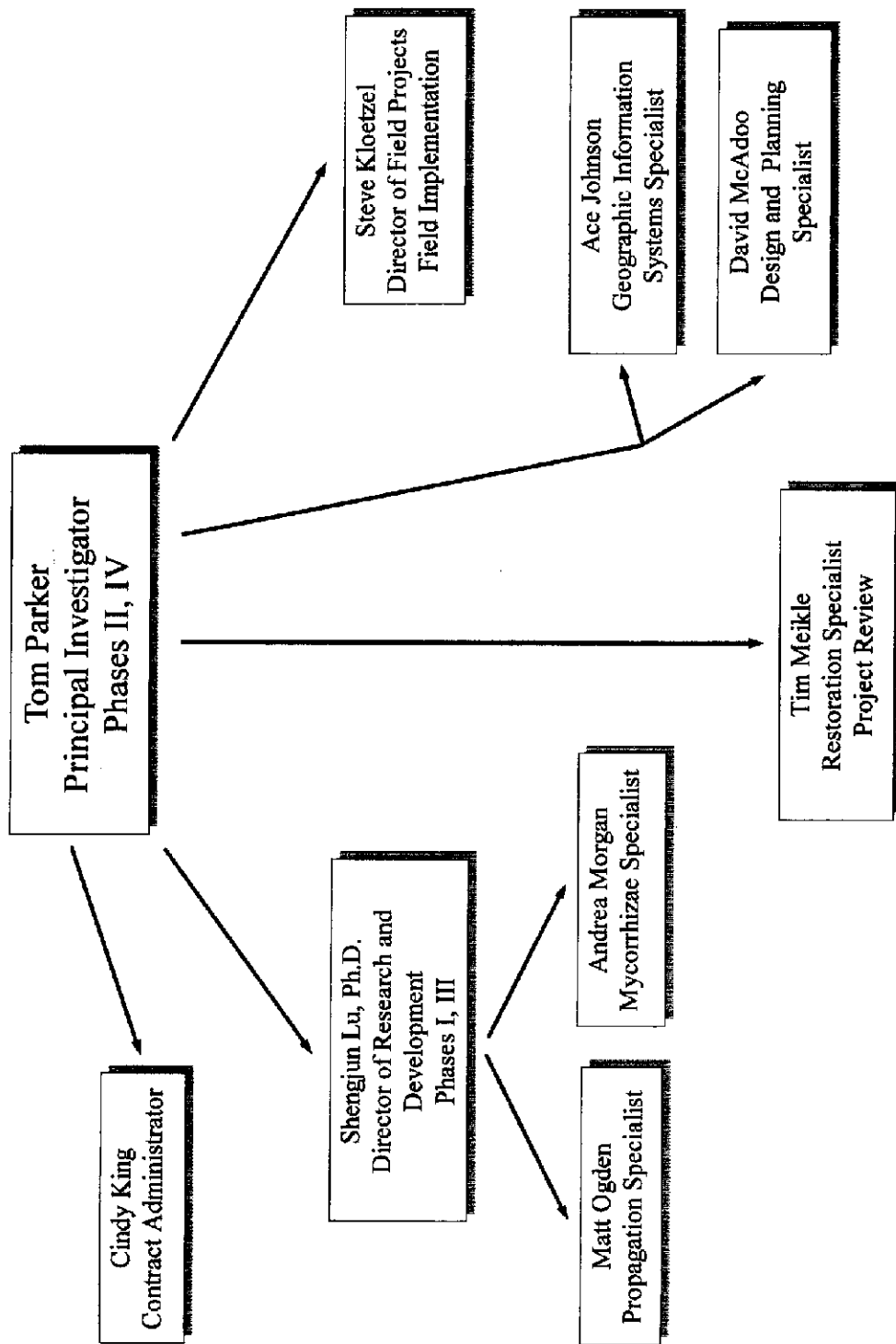
V. COSTS AND SCHEDULE TO IMPLEMENT PROPOSED PROJECT

V. COSTS AND SCHEDULE TO IMPLEMENT PROPOSED PROJECT

	Direct Labor Hours	Direct Salary & Benefits	Overhead Labor	Service Contract	Material & Acquisition	Misc. & Other Dir. Costs	Total Costs
Phase I							\$40,961.00
Task 1 - Consultant	440	\$9,680	\$14,520	\$0.00	\$4,411	\$4,100	
Task 2 - Consultant	150	3,300	4,950				
Phase II							\$160,035.00
Task 1 - Consulting	365	8,030	12,045	3,100	32,300	3,300	
Task 2 - Technician	1045	16,720	25,080		24,870	12,700	
- Consulting	196	4,312	6,468				
Ag. Resources Svcs				7,060			
Task 3 - Technician	60	960	1,440			1,650	
Phase III							\$206,906.00
Task 1-Consultant	520	11,440	17,160		9,635	3,290	
-Technician/Admin	450	7,200	10,800				
-Clerical/Intern	174	1,392	2,088				
Task 2 - Consulting	520	11,440	17,160				
-Technician/Admin	970	15,520	24,250				
-Clerical/Intern	434	3,472	5,208				
Task 3 - Consulting	520	11,440	17,160		5,000		
-Technician/Admin	400	6,400	9,600				
-Clerical/Intern	434	3,472	5,208				
Mycorrhizal Cons.				8,571			
Phase IV							\$362,883.00
Task 1-Consultant	780	17,160	25,740		14,740		
-Technician/Admin	832	13,312	19,968				
-Clerical/Intern	1,040	8,320	12,480				
Task 2 - Consultant	780	17,160	25,740				
-Technician	832	13,312	19,968				
-Clerical/Intern	1040	8,320	12,480				
- Outside Consult.				8,571			
-Plant Material					34,500		
Demo & Study Sup					111,112		
							\$770,785.00



VI. APPLICANT QUALIFICATIONS



Bitterroot Restoration is uniquely qualified to complete this project. BRI has developed propagation protocols for over 250 species of plant native to the western United States and produced these in commercially available quantities. Our company consists of restoration consulting, plant propagation, and field divisions. Our staff includes professionals in plant physiology, restoration ecology, horticulture, landscape architecture, forest ecology, and natural resources. In addition, we have associates specializing in range ecology, soil science, photo-interpretation, and soil microbiology. Currently, BRI's California clients include Yosemite National Park, Sequoia-Kings Canyon National Park, and Atlas Mine Superfund Site.

Tom Parker - Principal Investigator; Reclamation Specialist.

M.S. Resource Conservation, University of Montana. Tom will provide project management for all phases of the project and act as BRI's representative to CALFED. In addition, Tom will initiate and complete Phase II field investigations as part of this project. Currently, Tom supervises and coordinates projects in the field for our revegetation services division and also acts as riparian/wetland specialist for Bitterroot Consultants. Tom's academic work focused on the identification and delineation of wetland plant communities. He has completed Rosgen training in applied river morphology with expertise in the specification and application of coir products for erosion control and riparian restoration.

Dr. Shengjun Lu - Director of Research and Plant Production.

Ph.D. Plant Physiology, Oregon State University. Shengjun will direct Phases I and III of this project. In his current position, Shengjun oversees production areas both as a horticulturist and a manager. Dr. Lu has extensive knowledge and experience in plant propagation, plant nutrition, heavy metal toxicity, phytoremediation, root physiology, and root-microorganism associations. Since joining BRI in 1995, Dr. Lu has conducted research and consulting projects including phytoremediation of arsenic and pentachlorophenol contaminated soils, wastewater treatment wetlands, assessment of plant mortality to chlorine spills, nutrient requirements for mycorrhizal-colonized plants, and soil fertility analysis. Dr. Lu has six years of experience in the research area of tree physiological responses to environmental factors, plant nutrition, root physiology, and root diseases at Oregon State University. In addition, Dr. Lu has six years experience as a director of forestry research laboratories, and a researcher in the area of vegetation conservation, plant stress physiology, and plant community ecology in China.

Matthew Ogden - Plant Propagation Manager/Plant Production Assistant.

B.A. Botany, B.S. Forest Resource Conservation, University of Montana. Matt's years at BRI have focused on seed physiology, seed collection, seed treatment and propagation technique development. In addition, Matt has extensive experience in wetland delineation, restoration, plant taxonomy and T&E and Sensitive plant surveys.

Steven Kloetzel - Director of Bitterroot Revegetation Services B.S. Forest Resource Conservation, University of Montana. Steve will coordinate and implement field studies designed during Phase IV of the project. Steve has worked for BRI since 1991. His areas of expertise include: implementation and coordination of field projects, project cost estimation, development of out-planting techniques, erosion control installation and prescriptions, seeding techniques and

seed mix design, T&E and Sensitive plant surveys, NEPA documentation, and plant propagation.

Ace Johnson - Information Systems Manager and Special Projects.

A.A.S. Forest Recreation, Paul Smiths College. Ace will provide GIS and ACAD support for Phases II and IV of the project. Ace has over ten years of computer experience including computer applications (with a strong emphasis in AutoCAD), programming, system design/implementation, service, repair & consulting. Ace also has over sixteen years experience in surveying and civil engineering including GIS experience.

Cindy King - Contract Administrator. Cindy King will act as the Contract Administrator for the contract. Cindy began working at Bitterroot Restoration, Inc., in August, 1995. Her prior experience includes an AA degree in Criminal Justice and an AA degree as a Paralegal Specialist. In addition, she served as the EEOC officer for the State of Nevada. She currently administers all Federal superfund site contracts and large landscape restoration contracts.

David McAdoo- Design and Planning Specialist.

M.L.A. Landscape Architecture, California State Polytechnic University, Pomona. Dave will provide design and planning services during Phase IV of the project. David's previous experience includes habitat restoration and reclamation planning, including the incorporation of ecosystematic and sustainability issues, and native plant design and horticulture. His work at BRI has included restoration consulting, photo interpretation and GIS mapping, plan documentation, and the planning, coordination, and implementation oversight of restoration and monitoring projects.

Tim Meikle - Restoration Specialist; Director of Bitterroot Consultants.

M.S. Restoration Ecology, University of Wisconsin-Madison. Tim will provide critical review of documents produced during all phases of the project and provide consultation on the implementation of Phase II field investigations. Tim's range of previous work experience in restoration ecology includes Alaska, Wisconsin, Minnesota, South Dakota, and North Dakota. As Director of Consulting for BRI, Tim has experience in mined land reclamation, reclamation of contaminated sites, the 404 wetland permitting process, T&E species surveys and recovery efforts, vegetation reference site establishment and monitoring, utility corridor revegetation, wetland establishment, weed control and pesticide management, riparian revegetation, and grassland establishment.

Andrea Morgan- Mycorrhizae Specialist.

B.S. (pending) Forest Resource Conservation, University of Montana. Andrea will perform and coordinate mycorrhizal work to be completed during Phases II, III, and IV of this project. Andrea's work at BRI focuses on the culture of mycorrhizal fungi for the nursery inoculation program and verification of colonization. She coordinates all field collection and inoculation efforts. Her past work has included extensive experience with outplanting, erosion control installation, and seed collection.

**VII. COMPLIANCE WITH STANDARD TERMS AND CONDITIONS
JUSTIFICATION**

**NONCOLLUSION AFFIDAVIT TO BE EXECUTED BY
BIDDER AND SUBMITTED WITH BID FOR PUBLIC WORKS**

STATE OF MONTANA)
)ss.
COUNTY OF RAVALLI)

Thomas G. Parker, being duly sworn, deposes and says that he or
she is Principle Investigator of
B. Herroot Restoration, Inc.

the party making the foregoing bid that the bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation; that the bid is genuine and not collusive or sham; that the bidder has not directly or indirectly induced or solicited any other bidder to put in a false sham bid, and has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or that anyone shall refrain from bidding; that the bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder, or to secure any advantage against the public body awarding the contract of anyone interested in the proposed contract; that all statements contained in the bid are true; and, further, that the bidder had not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay, any fee to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham bid.

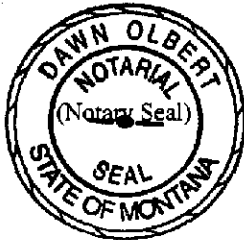
DATED: 7/1/98

BY: Thomas G. Parker
(Person signing for bidder)

Subscribed and sworn to before me on

July 1, 1998
Dawn Olbert

NOTARY PUBLIC for the State of Montana
Residing at Bozeman, Montana
My Commission Expires 9/9/98



NONDISCRIMINATION COMPLIANCE STATEMENT

Bitterroot Restoration, Inc.

Company Name

The company named above (hereinafter referred to as "prospective contractor") hereby certifies, unless specifically exempted, compliance with Government code Section 12990 (a-f) and California Code of Regulations, Title 2, Division 4, Chapter 5 in matters relating to reporting requirements and the development, implementation and maintenance of a Nondiscrimination Program. Prospective contractor agrees not to unlawfully discriminate, harass or allow harassment against any employee or applicant for employment because of sex, race, color, ancestry, religious creed, national origin, disability (including HIV and AIDS), medial condition (cancer), age, marital status, denial of family and medical care leave and denial of pregnancy disability leave.

CERTIFICATION

I, the official named below, hereby swear that I am duly authorized to legally bind the prospective contractor to the above described certification. I am fully aware that this certification, executed on the date and in the county below, is under penalty of perjury under the laws of the State of California.

TOM PARKER

OFFICIAL'S NAME

July 1, 1998

DATE EXECUTED

Ravalli County, Montana

EXECUTED IN THE COUNTY OF



PROSPECTIVE CONTRACTOR'S SIGNATURE

Principal Investigator

PROSPECTIVE CONTRACTOR'S TITLE

Bitterroot Restoration, Inc.

PROSPECTIVE CONTRACTOR'S LEGAL BUSINESS NAME

APPENDIX A : SPECIAL STATUS PLANT SPECIES TO BE ADDRESSED BY PROJECT

(Compiled from draft list of Delta Species proposed for inclusion in the Conservation Strategy.)

Type	Common Name	Scientific Name
Federally Listed as Endangered or Threatened		
P	Antioch Dunes evening-primrose	<i>Oenothera deltoidea</i> ssp. <i>howellii</i>
P	Antioch Dunes evening-primrose (critical habitat)	
P	Colusa grass	<i>Neostaphia colusana</i>
P	Contra Costa goldfields	<i>Lasthenia conjugens</i>
P	Contra Costa wallflower	<i>Erysimum capitatum</i> ssp. <i>angustatum</i>
P	Contra Costa wallflower (critical habitat)	
P	Fleshy owl's clover	<i>Castilleja campestris</i> ssp. <i>succulenta</i>
P	Green's tuctoria	<i>Tuctoria greenii</i>
P	Large-flowered fiddleneck	<i>Amsinckia grandiflora</i>
P	Palmate-bracted bird's-beak	<i>Cordylanthus palmatus</i>
P	Sacramento Orcutt grass	<i>Orcuttia viscidula</i>
P	Slender Orcutt grass	<i>Orcuttia tenuis</i>
P	Soft bird's-beak	<i>Cordylanthus mollis</i> ssp. <i>mollis</i>
P	Solano grass	<i>Tuctoria mucronata</i>
California Listed as Endangered, Threatened, Rare, or Fully Protected		
P	Boggs lake hedge-hyssop	<i>Gratiola heterosepala</i>
P	Delta button-celery	<i>Eryngium racemosum</i>
P	Mason's lilaeopsis	<i>Lilaeopsis masonii</i>
P	Suisun thistle	<i>Cirsium hydrophilum</i> var. <i>hydrophilum</i>
Federally Proposed		
California Species of Special Concern, or CNPS List 1 or 2		
P	Alkali milk-vetch ^b	<i>Astragalus tener</i> var. <i>tener</i>
P	Bristly sedge ^b	<i>Carex comosa</i>
P	Brittlescale ^a	<i>Atriplex depressa</i>
P	Delta mudwort ^b	<i>Limosella subulata</i>
P	Delta tule-pea ^a	<i>Lathyrus jepsonii</i> var. <i>jepsonii</i>
P	Eel-grass pondweed ^a	<i>Potamogeton zosteriformis</i>
P	Heartscale ^a	<i>Atriplex cordulata</i>
P	Heckard's pepper-grass ^a	<i>Lepidium latipes</i> var. <i>heckardii</i>
P	Hispid bird's-beak ^b	<i>Cordylanthus mollis</i> ssp. <i>hispidus</i>
P	Interior California larkspur ^b	<i>Delphinium californicum</i> ssp. <i>interius</i>
P	Mad-dog skullcap ^a	<i>Scutellaria lateriflora</i>

Type	Common Name	Scientific Name
P	Northern California black walnut (Native stands) ^b	<i>Juglans californica</i> var. <i>hindsii</i>
P	Pincushion navarretia ^b	<i>Navarretia myersii</i>
P	Rose-mallow ^a	<i>Hibiscus lasiocarpus</i>
P	Showy madia ^b	<i>Madia radiata</i>
P	Slough thistle ^b	<i>Cirsium crassicaule</i>
P	Suisun marsh aster ^a	<i>Aster lentus</i>
P	Valley sagittaria ^a	<i>Sagittaria sanfordii</i>
P	Valley spearscale ^a	<i>Ariflex joaquiniana</i>